AbstractID: 5405 Title: Segmentation of CT image using fast-marching and active-contour

Purpose: To reduce the workload of manual contouring by developing a semiautomatic method that can successfully perform segmentation of liver, kidney, bladder, lung, and trachea.

Method and Materials: A Canny edge detector was used to extract edges. The obtained edge image was used by a gradient vector flow (GVF) snake algorithm to deform an initial surface onto the edge. For the GVF snake to work, the initial surface has to be reasonably close to the edge. This problem was solved by using a fast marching algorithm on the Canny edge image. Several measures were adopted to prevent the initial surface to leak through the places where the edge was broken.

Results: This segmentation method was tested on clinical CT images and found to be very successful in liver, kidney, bladder, lung, and trachea. There are cases when the organ to be segmented contacted with other organs and there is no image contrast observed between them. Small error may exist in those areas. Those errors can be easily identified and corrected by some simple human interactions.

Conclusions: Our study has shown that the algorithm we developed can successfully perform CT image segmentation of several important structures. This algorithm can greatly reduce the workload of contouring the patient.